A TABLE FOR THE CALCULATION OF SURFACE TENSION FROM MEASUREMENTS OF SESSILE DROPS

BY N. R. TAWDE
PHYSICS DEPARTMENT, KARNATAK UNIVERSITY, DHARWAR,

AND

K. G. PARVATIKAR
PHYSICS DEPARTMENT, RAJARAM COLLEGE, KOLHAPUR

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ABSTRACT. The present paper is an extension of the work of Tawde and Parvatikar on sessile drops A table is prepared of the values of a^2/r^2 against h/r in the range from 0.5100 to 0.5708 at interval of 0.0002

Taylor and Alexander (1944) have fitted up an empirical equation in the case of sessile drops from which the values of a^2/r^2 are obtained for the corresponding values of h/r, where a^2 is the capillary constant defined by $2\gamma/g\rho$, γ being the surface tension of the liquid, ρ its effective density, r, the radius of the sessile drop, and h, the height of it from the equatorial plane. From the knowledge of the measurable quantity h/r, a^2/r^2 could be known from the tables and hence γ, the surface tension could be determined.

Recently, the authors (1951) have shown that this function of h/r and a^2/r^2 could also be obtained by modifying the standard tables of Bashforth and Adams (1883). The table thus drawn up has been put to test for its usefulness by using the experimental measurements on sessile drops. By a rigorous study it has been shown that this table is also equally dependable for the determination of surface tension from measurements of sessile drops. This table gave values of h/r and a^2/r^2 for the values of β ($\beta=2b^2/a^2$, where b is the radius of curvature at the apex of the drop) ranging from 25 to 50 at interval of unity and from 50 to 100 at interval of two. It was suggested therein that a more accurate table could be drawn up by using any other available intermediate values of β. Since it is noticed that the tables of Bashforth and Adams are at intervals of 0.1 in β in the range 0.0 to 46.7, and as our earlier table was only exploratory with a large interval in β of the order of 1.0 and 2.0 as mentioned above, it is thought desirable to calculate here the values of h/r and a^2/r^2 for all intermediate values corresponding to 0.1 interval in β and prepare a more detailed and comprehensive table. This table is worked out only for the range of $\beta=22.0$ to 46.7. The values of h/r and a^2/r^2 are calculated first in the same way as shown in the

It will be interesting to examine whether observations on the sessile drop in conjunction with this table can serve as one of the standard methods for the measurement of surface tension. This work is now in progress.

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